September 27, 2006

MEMORANDUM TO: Michael L. Scott, Chief
Safety Issues Resolution Branch
Division of Safety Systems
Office of Nuclear Reactor Regulation

FROM: Joseph A. Golla, Project Manager **/RA/**
Generic Communications and Power Uprate Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MAY 23-25, 2006, PUBLIC MEETING REGARDING GSI-91

On May 23-25, 2006, the U.S. Nuclear Regulatory Commission (NRC) staff met with representatives of the Nuclear Energy Institute (NEI), the Pressurized Water Reactors (PWR) Owners Group (PWROG), individual PWR licensees, and strainer vendors at the Double Tree Hotel, Rockville, Maryland. The list of attendees is enclosed, also available is a non-propriety slide presentation made at the meeting in the NRC Agencywide Documents Access and Management System (ADAMS) under Accession No. ML062080686. The purpose of the meeting was to discuss several key technical issues associated with GSI-191 PWR sump performance evaluations, identify the paths forward for resolution of these issues, and review the on-going testing efforts made by the five strainer vendors to validate the new strainer designs. Following this meeting, NRC staff held meetings with each individual strainer vendor separately and discussed their testing programs.

The meeting was opened by Mr. Jon Hopkins, Project Manager for GSI-191, Office of Nuclear Reactor Regulation. Mr. Hopkins provided the overall meeting purposes and the agenda to discuss four technical issues: Chemical Effects, Downstream Effects, Coatings, and Near Field effect. The first presentation was given by Mr. Michael Scott, Branch Chief of the Safety Issue Resolution Branch, Office of Nuclear Reactor Regulation. Mr. Scott informed the participants of top-level NRC activities planned to bring GSI-191 to closure and the desire to reach agreement on the path forward with the industry. He indicated that future NRC activities include observation of strainer vendor testing, issuing NUREG reports addressing the results of NRC confirmatory testing, conducting plant audits and inspections, evaluating extension requests, and developing GL 2004-02 closure letters. After his presentation, the NRC technical staff gave detailed presentations covering these four technical issues. After each NRC staff presentation, the industry provided a corresponding presentation and its view of the path forward for each item, except near field effect. The information exchange on these four subjects is summarized below.

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Chemical Effects

The presentation titled "Resolution of Chemical Effects Issues" was provided jointly by Mr. Paul Klein, Office of Nuclear Reactor Regulation and Ms. Paulette Torres, Office of Nuclear Regulatory Research. Ms. Torres presented the latest results of chemical effect head loss tests conducted by Argonne National Laboratories (ANL) for the NRC. The test results show that head loss in sodium hydroxide (NaOH) environments can be significant due to formation of an aluminum hydroxide precipitate. Significant head loss occurred without visible indication of precipitates. The onset of significant head loss of NaOH environments was variable. Preliminary analysis indicates that head loss is time dependent and is dependent upon aluminum concentration, temperature, and pH. The preliminary head loss test results with the sodium tetraborate ($Na_2B_4O_7$) solution show no significant head loss with the dissolved aluminum concentration (50 ppm) equivalent to that measured in Integrated Chemical Effect Test (ICET) 5. Increasing the dissolved aluminum concentration from 50 ppm to 100 ppm after 5 days caused rapid, significant head loss.

Based on the latest ANL test results, Mr. Klein pointed out the importance of chemical effects. He subsequently discussed the recent NRC staff visit to Fauske Laboratory where the industry is testing potential alternate pH buffers. The NRC staff encouraged industry to continue the investigation of alternate buffers. The current alternate buffer tests, though informative, appeared to be more screening tests than a comprehensive study to support a licensee's change to an alternate buffer. Then, he discussed key technical issues related to the closure of chemical effects and the review of WCAP -16530-NP titled "Evaluation of Post-Accident Chemical Effects in Containment Sump Fluids to Support GSI-191." In each case, the discussion included NRC staff expectations regarding industry actions on this issue and planned path forward. These issues are listed below:

1. WCAP chemical model applicability to plant conditions.
2. Applicability of separate effects tests to an integrated environment.
3. The adequacy of chemical surrogate materials and the use of chemical surrogates in non-representative environments.
4. The evaluation of plant-specific pool conditions outside the knowledge base from testing.
5. NRC review of strainer vendors' chemical-effect, head loss test plans.
6. The possibility of head loss from amorphous-type chemical products on a clean strainer or with a sparse bed.
7. Arrival sequence of chemical products and the impact on head loss.
8. The impact of chemical products on components downstream of the strainer.
9. Additional issues that could be identified by future testing or analysis.

In response to the NRC's presentation, the representatives of PWROG provided feedback regarding these technical issues identified by the NRC staff. The industry believes that the WCAP chemical model addresses long-term and large-scale sump chemistry behavior. Separate effects testing data, combined with literature data and ICET results can be used to develop an integrated-effect model, using applicable chemistry principles. Based on the separate effect test data, the PWROG representative indicated that the surrogates created as

part of the PWROG program adequately represent the key properties of the precipitates, particularly filterability and settling rate. In terms of applicability range, the industry believes that the model covers the complete range of expected plant chemistry and temperature conditions. Therefore, the model will be used by individual strainer vendors as part of their strainer qualification test. During head loss testing, the chemical surrogates will be treated like all other particulate debris material.

After the industry's presentation, NRC staff caucused and provided the following feedback: (1) the NRC staff acknowledged the feedback provided by industry but indicated the technical issues identified during Mr. Klein's presentation remained valid issues; and (2) the NRC staff will be proceeding towards issue resolution, using the path forward identified in the presentation.

Downstream Effects

The presentation titled, "Path Forward to Resolution of Downstream Effects Issues" was given by Mr. Thomas Hafera, Office of Nuclear Reactor Regulation. Mr. Hafera indicated that almost all licensees are using the PWROG report WCAP-16406-P as their downstream effects evaluation methodology. The NRC staff has performed a preliminary review of this report and provided comments to the PWROG. Based on staff's comments on WCAP-16406-P and needs identified by industry, PWROG is currently developing guidance that will be specific to the evaluation of reactor fuel. This guidance will be presented in a separate topical report. The timely submittal of this new WCAP report is important for both licensees and the NRC staff to reach closure on the evaluation of downstream effects in the core. Mr. Hafera pointed out that several challenging issues need to be resolved in the near future: the formal submittal of WCAP-16406-P by PWROG and its review by NRC, vendor testing methodology for downstream source term, and validation of wear and blockage models. In addition, because the application of this report requires a large amount of plant-specific information, the plant-specific evaluation could be complicated. In order to support the staff's confirmatory evaluation regarding generic core downstream effects, fuel and reactor internal design information is needed from the industry.

In response to the NRC's presentation, Mr. Timothy Andrecheck of Westinghouse provided feedback regarding the issues raised by the staff. In his presentation titled "Downstream Effects - Resolution of NRC Review Issues", Mr. Andrecheck indicated that the testing plans for addressing downstream source term are included as part of written strainer qualification test plans developed for individual licensees. Therefore, he recommended that the staff interact with strainer vendors and licensees to resolve the debris source issue. Regarding validation of the wear and blockage model, the revised WCAP report will provide new information. He also pointed out that Westinghouse is in the process of developing the proper communication channel to provide fuel and vessel internal information to the NRC staff.

Coatings

Mr. Matthew Yoder, Office of Nuclear Reactor Regulation, and Mr. Ervin Geiger, Office of Nuclear Regulatory Research, jointly gave a presentation titled "Path Forward to Resolution of Coating Issues." Mr. Geiger first presented the latest NRC coating transport test results. The tests conducted by the Naval Surface Warfare Center, Carderock Division, for the NRC covered

five coating systems, three coating chip size ranges, flat and curled shapes. A quiescent tank was used to measure the time for different coating chips to sink and the terminal velocity (i.e., velocity at which the chips start to move on the floor). The results showed that heavy coating chips mostly sank immediately with a fraction (10 to 20 percent) remaining on the surface indefinitely. In steady-state terminal velocity tests, the terminal velocities generally ranged from .04 ft/s for smallest-lightest chips to 0.46 ft/s for the large, curled six-layer epoxy chips. Coating transport tests were also conducted to determine the chip-tumbling velocity. It was observed that submerged coatings debris in the size range of 1/64-inch to 2 inches had limited potential for transport at stream velocities of 0.2 ft/s and less. If dropped onto the water surface, alkyd coatings debris and a fraction of the heavier coatings debris may remain buoyant and transport. Mr. Yoder pointed out that licensees need to be able to justify the characteristics (size, density, shape) of their coating debris in order to take credit for lack of debris transport to the sump. He discussed the on-going NRC review activities, which include the review of two proprietary coating zone of influence (ZOI) testing reports and the Electric Power Research Institute (EPRI) unqualified coating test report. In addition, he pointed out an issue related to coating review area, which is the verification of the adequacy of current industry assessment techniques for degradation of qualified coatings.

In response to staff's presentation, Mr. Dan Cox from Southern California Edison on behalf of PWROG gave a presentation to discuss the remaining technical issues related to coatings. First, he indicated that the industry will submit two coating ZOI testing reports to NRC for information purposes. It was indicated that licensees and their screen vendors who credit settling of coating debris will address NRC concerns about debris preparation, scaling, near field effect, and debris introduction in licensee submittals. Contrary to staff's view of the assessment techniques for degradation of qualified coatings, Mr. Cox stated that visual inspections had successfully identified degraded and failed qualified coatings. Therefore, licensee visual inspection and corrective actions performed during scheduled outages provide reasonable assurance that coatings will function as designed. He added that physical testing is destructive and not as effective as the current methods of visual inspection. In order to resolve this issue, individual licensees may assume 100 percent failure of the containment coatings and perform transport testing and strainer proof testing to ensure adequate head loss margin exists to account for the coating debris. Alternately, licensees have the option of performing physical testing on the coatings to ensure their integrity or provide evidence that visual examinations of the coatings can accurately identify areas of degradation. Mr. Cox and Mr. Jon Cavallo of American Society for Testing Materials (ASTM) described plans to perform physical testing on containment coatings at a sample of operating plants in order to verify that visually sound coatings are able to meet their original design requirements. The NRC staff was invited to observe these tests, however, a formal test plan and schedule had not been prepared in time for this meeting. The NRC staff would like to remain involved in this effort and will be discussing this topic further at planned ASTM workshops and EPRI coating aging task group meetings.

Near Field Effects

Mr. Shanlai Lu of the Office of Nuclear Reactor Regulation gave the presentation titled "Prototypical Head Loss Testing And Near Field Effects." He first discussed the overall head loss testing approach adopted by the industry to validate the new strainer design. He indicated that a test that combines near field transport and head loss into one integral test can

significantly reduce the approach velocity and strainer head loss for a given debris load and may not be prototypical of actual plant conditions. PWR licensees may take this approach to reduce the strainer size or the amount of thermal insulation material that needs to be removed from the plant, provided the combined integral tests are scaled properly to reflect the actual plant sump layout. In addition, proper testing procedures need to be developed and verified to conservatively simulate the debris transport and the debris accumulation on the surface of the strainer. Based on observation trips to several vendors, he pointed out that some test designs had little similarity between the test facility set up and the expected actual strainer configuration in the plant. The testing procedures adopted by some strainer vendors could not conservatively serve the purposes of maximizing both the head loss and the amount of debris transported to the strainer. Considering the potential non-conservative strainer sizing due to improper testing practice, the staff expects licensees and vendors who take credit for near field settlement to provide information in their Generic Letter (GL) supplemental responses to address the similitude of the debris materials, scaling between the test strainer module and the plant replacement strainer configuration, and testing procedures for debris preparation and introduction. Following the staff presentation, Mr. John Butler from NEI responded that they understood staff's concerns, and they agreed that the issues need to be dealt with by strainer vendors.

NRC/Strainer Vendor Meeting

Following the NRC/NEI meeting, a 1½-day meeting was held between NRC staff and five strainer vendor groups: Area/PCI/Alden, Enercon/Alion, CCI, General Electric and Atomic Energy of Canada Ltd (AECL). The meeting started on the morning of May 24 and ended on May 25. Mr. Michael Scott opened the meeting by stating that the purpose of the meeting was for strainer vendors to provide a general overview of their test programs and results to the staff for feedback and comments. Then, Mr. Shanlai Lu talked about the common testing issues identified by the staff during vendor testing visits and audits with a presentation titled "Prototypical Head Loss Testing." These issues include debris surrogate material preparation, scaling of circumferential debris accumulation, the possible dependency of head loss on fluid temperature, debris introduction sequence during testing, and the validity of taking downstream samples from a prototypical head loss test. Following Mr. Lu's presentation, each of the five vendors separately presented its testing program according to the agenda requested by the staff before the meeting. After each vendor presentation, staff met separately and provided feedback to the vendor. The following summarizes each vendor's testing program and the staff's feedback.

Areva/PCI/Alden

Mr. Lee Williams from Areva NP presented the testing program jointly supported by Performance Contracting, Inc. (PCI), Alden Labs and Areva NP. The program is currently supporting PCI strainer installation at fourteen PWR units. The main testing apparatus of the program is a rectangular-shaped test flume capable of introducing turbulence with spray nozzles upstream of the strainer test section. For all the new PCI strainers, the surface approach velocity falls into the range from 0.0033 to 0.0272 ft/sec. Because of the low approach velocity, Mr. Williams indicated that reflective metal insulation (RMI), tags & labels, and paint chips do not collect on the screen. Therefore, they did not contribute to the total head loss. In general, the measured head loss was less than that predicted by the NUREG/CR-6224

correlation, which was used during the initial sizing calculation. All the head loss tests were conducted following the same debris introduction sequence for RMI, particulate, fibrous, latent fiber and chemical debris. The debris was introduced from three locations throughout the flume, 1-3 feet upstream of the strainer or directly on top of the strainer. The chemical debris testing was performed by adding particulate, along with all other debris, to the ambient temperature tap-water flume. The staff commented on the presentation and provided feedback to the vendor group. The staff indicated that the current test methodology (e.g., addition of chemical surrogate to ambient temperature tap-water) does not adequately address chemical effects. In his conclusion remarks, Mr. Shanlai Lu indicated that the NRC staff had requested a table listing plants using different debris introduction locations so that the staff could identify the number of PWR units taking credit for the near field effect. Mr. Williams acknowledged that the table was not provided and agreed to provide the table at a later date to the staff. In addition, the staff pointed out that the debris introduction sequence employed by Areva NP may potentially cause non-conservative head loss measurement depending on where the debris is introduced into the test apparatus. Therefore, the NRC staff will look into this issue and verify the validity of the head loss test results of selected PWR licensees support by Areva NP.

Alion/Enercon

Representing the Alion/Enercon team, Mr. Robert Choromokos, Mr. Gil Zigler and Mr. Aaron Smith presented the testing program that would provide the technical basis for validating the top-hat strainer design for 17 PWR units. Their presentation was prepared according to staff's request sent to NEI before the meeting (ADAMS Accession No. ML061930081). It covered the general aspects of the testing program and specific topics such as scaling, debris preparation, debris introduction, head loss due to chemical effects, screen by pass testing, and termination criteria. It was indicated that debris was introduced into the test tank with continuous turbulence until most of the debris settles on the strainer surface. No credit was taken for near field settlement. Additional conservatism was built into the test program by boiling fibrous debris for 15 minutes before shredding. The process helped to breakdown the binder used for manufacturing fibrous insulation. Responding to staff's question about whether this debris processing technique can have a significant impact on head loss, Mr. Zigler stated that the head loss can vary by 30-40 percent with or without boiling. In addition to two test loops for fibrous/particulate debris head loss measurement, Alion has built a chemical effect head loss test loop, which has automated temperature control. Alion is planning to use this loop to study the head loss of chemical precipitates due to different buffer agent and debris material combinations. The results will be used to establish "bump-up" factors that can be applied to the full-scale modular head loss results to justify whether the remaining Net Positive Suction Head (NPSH) margin is sufficient for expected chemical effects. In order to reduce the fiber debris screen pass-through fraction, Enercon has developed a patent-pending debris eliminator technology that uses metal wire mesh filter embedded in the top-hat strainer module downstream of the strainer surface. Mr. Aaron Smith mentioned that a significant reduction in debris concentration could be achieved downstream of the strainer surface with the addition of this technology. The NRC staff commented on the presentation and indicated the need to interact more with Alion regarding the hydraulic characteristics of the debris eliminator. Overall, the staff felt that the Alion/Enercon team has developed a comprehensive test program to support its customers.

Control Component, Inc. (CCI)

Dr. Urs Blumer presented CCI's pocket strainer testing program according to the presentation agenda requested by the staff. He described three test loops used by CCI to validate the pocket strainer design. A total of two thousand test runs have been performed using the small-scale head loss test loop. Two hundred test runs were performed with the horizontal large-scale loop. CCI has constructed a horizontal multi-functional loop to evaluate near strainer debris settlement, temperature effects, and chemical effects. Ten head loss test runs have been performed with this multi-functional loop. One of the key test observations is that a uniform thin bed cannot be formed in a pocket strainer under realistic conditions due to the very low approach velocities and the complex strainer surface orientation. For this testing, the geometric scaling is done by ratio of number of pockets, subtracting sacrificial area for tape, tags, and stickers. He indicated that CCI does not credit significant debris settling in the vicinity of the strainer modules. In almost all cases, debris was introduced in the test immediately before the pockets. CCI has conducted some bench top chemical effect tests to evaluate the influence of tap-water chemistry, the particulate surrogate material (stone flour) and borated water. CCI is planning to perform chemical effects head loss testing in a multi-functional test loop. In terms of termination criteria, CCI used visual criteria and differential pressure measurement versus time to determine the end of the head loss test. No quantitative termination criteria was used. After Dr. Blumer's presentation, the NRC staff indicated that more interaction is needed to understand the details about this testing approach and the facility. Specifically, the staff will be interested in the Computational Fluid Dynamics-based scaling methodology, head loss termination criteria, downstream sampling, the chemical effects evaluation methodology, and the use of high-power water wash to break the binder of fiber material.

General Electric

A closed meeting was held between the staff and General Electric (GE) on May 25. Some PWR licensees supported by GE were present during the meeting. Representatives from GE first provided an overview of GE's active and passive strainer program. Then they shared the key test observations from their on-going testing program. The methodology for active and passive strainers was discussed. In addition, they presented to the staff their debris introduction and preparation procedure, and plans for head loss testing for chemical effects and downstream measurements. In response to staff's concern of near field effect, GE indicated that they have been developing proper scaling methodology and conducting scaled integral head loss testing to simulate debris settlement near the strainer. The staff provided feedback to GE about its testing program and commented that GE's effort to address near field effect should be encouraged.

AECL

A closed meeting was also held between the staff and AECL on May 25. Some PWR licensees supported by AECL were present during the meeting. Representatives from AECL first discussed the history of the AECL strainer design, then they discussed the finned strainer design concept and the design features. They indicated that their testing methodology did not take any credit for near field debris settlement and they relied on reduced scale and large-scale head loss testing facilities to validate the strainer design. In addition to normal debris head loss

testing, AECL has testing programs to address chemical effects and downstream effects. Chemical effects testing will be performed using a reduced scale test facility. Detailed plans for these tests are still under development. The staff commented on the presentation and indicated that more interaction is needed for staff to evaluate this testing approach and the testing facility. The staff indicated that since AECL did not plan to take credit for near field effect, its head loss measurement could be very conservative.

Enclosures:
List of Attendees

Enclosure 1:	ML062080698	Path Forward to Resolution of Coatings Issues
Enclosure 2:	ML062080703	Resolution of Chemical Effects Issues
Enclosure 3:	ML062080709	Prototypical Head Loss Testing
Enclosure 4:	ML062080714	Prototypical Head Loss Testing and Near Field Effects
Enclosure 5:	ML062080718	Path Forward/Closure Plan for GSI-191
Enclosure 6:	ML062080722	Path Forward to Resolution of Downstream Effects Issues
Enclosure 7:	ML062080725	NRC/NEI Meeting on Path Forward for GSI-191
Enclosure 8	ML062080727	NRC GSI-191 Vendor Testing Information - Area
Enclosure 9	ML062080728	Resolution of GSI-191 Overview of CCI Testing
Enclosure 10:	ML062080730	Chemical Effects Review Issues
Enclosure 11:	ML062080733	Coatings Review Issues
Enclosure 12:	ML062080735	Downstream Effects Review Issues
Enclosure 13:	ML062080738	Enercon Team NRC Presentation

Chemical effects testing will be performed, using reduced scale test facility, and detailed plans for these tests are still under development. The staff commented on the presentation and indicated that more interaction is needed for staff to evaluate this testing approach and the testing facility. The staff indicated that since AECL did not plan to take credit for near field effect, its head loss measurement could be very conservative.

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Public Meeting of Industry and NRC

NAME	ORGANIZATION
Davood Abdollahian	GE
Michael Ambrosino	PSEG Nuclear
Tim Andreychek	Westinghouse
Ralph Architzel	NRC
Denis Blakely	FENOC
Jim Bleigh	PCI
John Broschak	NMC-Palisades
Dan Brosnan	PG&E-Diablo Canyon
John Butler	NEI
Ed Carmack	SNC
Jimmy Cash	SNC
Al Casillo	NMC-Palisades
Jon Cavallo	CC&L
Daniel Cox	So. Calif. Edison-SONGS
Brian Davenport	Exelon
Maurice Dingler	PWROG
Stephen Dolley	Platts/Inside NRC
Brian Dunn	FPL
Gayle Elliott	AREVA NP
Thomas Engbring	PUNGS/APS
Nigel Fisher	AECL
Chuck Feist	TXU Power
Gregg Ferguson	Entergy/Waterford 3
Michael Friedman	OPPD
RC Gamberg	Duke Energy
Joe Gasper	OPPD

John Gisclan	EPRI
Joseph Glazier	General Electric
Ken Greenwood	AREVA NP
Jack Grobe	NRC
Maria Rosa Guiterez	Entergy-Waterford 3
Dave Guzonas	AELL
Addison Hall	Dominion
Michelle Hart	NRC
Amy Hazclhoff	NMC-Palisades
Rick Heath	AREVA
Glen Hermes	Constellation
Jon Hopkins	NRC
Kenneth Isley	Duke Energy
Adi Ivani	Entergy-IPEC
Walton Jensen	NRC
Michael Kai	Dominion
Saif Khan	Entergy-ANO
Paul Klein	NRC
Helmut Kopke	Sargent & Lundy
Mark Kostelnjk	Constellation
Dale Krause	So. Carolina Elec. & Gas Co.
Annie Lane	Westinghouse
Eric Larson	GE
Paul Leonard	AEP-DC Cook
Shanlai Lu	NRC
Kiran Mathur	PSEG
Dave Midlik	Southern Nuclear
Craig Millen	Progress Energy

Mike Murdock	Duke Energy
Natalie Musher	Entergy-ANO
Robert Peterson	Sargent & Lundy
Rick Reid	Westinghouse
Ruth Reyes	NRC
Addison Ricker	Proto Power
Bill Rinkacs	Westinghouse
Tony Pietrangelo	NEI
Paul Pyle	Westinghouse
Gilbert Rigler	Alion
Dewey Rochester	Duke Energy
Thomas Schulz	FPL Energy-Seabrook
Michael Scott	NRC
Girja Shukla	NRC
Aaron Smith	Enercon
Buddy Taylor	AECL
Roger Waters	Entergy-IPEC
Jared Wermiel	NRC
Leon Whitney	NRC
H. Lee Williams	AREVA
Paul Willoughby	Dominion
Gordon Wissinger	AREVA
James Wong	NMC
Jim Wright	Constellation Energy
Tomoho Yamada	JNES
Matt Yoder	NRR
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Gregg Ferguson	Entergy/Waterford 3

Michael Friedman	OPPD
Robert Gamberg	Duke Energy
George Geaney	MPR Associates
John Gisclon	EPRI
Joseph Glazier	General Electric
Joe Golla	NRC
Ken Greenwood	AREVA NP
Jack Grobe	NRC
Maria Rosa Gutierez	Entergy-Waterford 3
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Paul Leonard	AEP-DC Cook

Ken Leonelli	SCE&G
Shanlai Lu	NRC
Kiran Mathur	PSEG
Dave Midlik	Southern Nuclear
Craig Millen	Progress Energy
Mike Murdock	Duke Energy
Natalie Mosher	Entergy-ANO
Geoffrey Ottenberg	NRC-Reigon I
Robert Peterson	Sargent & Lundy
Rick Reid	Westinghouse
Ruth Reyes	NRC
Addison Ricker	Proto Power
Bill Rinkacs	Westinghouse
M. Padmanabhan	Alden Research Lab
Tony Pietrangelo	NEI
Brian Punn	FPL
Paul Plye	Westinghouse
Dewey Rochester	Duke Energy
Thomas Schulz	FPL Energy-Seabrook
Michael Scott	NRC
Jeff Sharkey	NRC
Girja Shukla	NRC
Aaron Smith	Enercon
Buddy Taylor	AECl
Kirk Trovler	FENOC
Steve Unikewicz	NRC
Roger Walters	Entergy-IPEC
Jared Wermiel	NRC

Leon Whitney	NRC
H. Lee Williams	AREVA
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Marty Badewitz	Dominion
G.S. Bedi	NRC
Dan Brosnan	PG&E-Diablo Canyon
Jimmy Cash	SNC
Dave Cullison	NRC
Nigel Fisher	AECL
Michael Friedman	OPPD
Larry Fleisher	GE
Joe Gasper	OPPD
George Geaney	MPR Associates
Joseph Glazier	General Electric
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Steve Unikewicz	NRC
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Enclosure